EUROPEAN PARLIAMENT

DIRECTORATE-GENERAL FOR INTERNAL POLICIES

POLICY DEPARTMENT A
ECONOMIC AND SCIENTIFIC POLICY

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Functioning of the ETS and the Flexible Mechanisms

ENVI

EN DE/FR 2011

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ENVIRONMENT, PUBLIC HEALTH AND FOOD SAFETY

Functioning of the ETS and the Flexible Mechanisms

NOTE

Abstract

In 2003, the EU established a 'cap & trade' emissions trading system (EU ETS) for greenhouse gas (GHG) emissions of large industrial sources such as power plants, refineries and steel works. Since 2005, covered installations need a tradable allowance for each tonne of GHG emission. To ensure a reduction of -71% in 2050 compared to 2005 the cap is constantly reduced. The briefing explains the basic functioning of the EU ETS and how emission reduction projects outside the EU, so called Flexible Mechanisms, can be used for compliance under the EU ETS.

IP/A/ENVI/NT/2011-02 March 2011

PE 457.362 EN

This document was requested by the European Parliament's Committee on Environment, Public Health and Food Safety.

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LINGUISTIC VERSIONS

Original: EN
Translation: DE, FR

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Manuscript completed in March 2011.

This document is available on the Internet at:
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LIST OF ABBREVIATIONS

Annex I	Developed Countries under the UNFCCC
BAU	Business as usual
CDM	Clean Development Mechanism
CER	Certified Emission Reduction
CITL	Community Independent Transaction Logg (Registry for tracing transactions under the EU ETS)
CMP	Conference of the Parties serving as the Meeting of the Parties of the KP
CO_2e	CO_2 equivalent (of other GHGs, such as methane)
EEX	European Energy Exchange (Leipzig)
ERU	Emission Reduction Unit
EU ETS	European Union Emission Trading System
EUA	European Union Allowance
GHG	Greenhouse gas
HFC-23	Hydrofluorocarbon 23 (industrial gas with a very high CO_2e)
JI	Joint Implementation
KP	Kyoto Protocol
Mt	Mega tonne (1 million metric tonnes)
N_2O	Nitrousoxide
NAP	National Allocation Plan
non-Annex I	Developing Countries under the UNFCCC
NO_x	Nitric/nitrogen oxide
SO_x	Sulfur oxides
UNFCCC	United Nations Framework Convention on Climate Change

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1. INTRODUCTION TO THE EU ETS

1.1. Overview

In December 2008, the EU adopted a comprehensive package of greenhouse gas (GHG) emission reduction to further enhance the international reputation of the EU as a leader on climate policy. The objective of the so called energy and climate package is to reduce greenhouse gases by at least 20% by 2020 relative to 1990 emission levels, increase the share of renewable energy in the EU to 20% and to reduce energy consumption by 20% compared to projected trends. In addition, it was also agreed within the package that 10% of fuel for transport should be sourced from biofuels, electricity or hydrogen by 2020.

An essential policy instrument to achieve these climate policy objectives is the emissions trading system (ETS), which was introduced in 2005 (Directive 2003/87/EC) and is based on the 'cap and trade' principle. This simply means that a 'cap' or limit on the total amount of particular greenhouse gas emissions that can be emitted is set for all factories, power plants or other installations participating in the ETS. More than 11,000 installations are regulated by the ETS, responsible for almost half of GHG emissions emitted in the EU. GHG emissions from sectors not covered by the ETS (buildings, transport, agriculture, etc.) are subject to the Effort Sharing Decision (406/2009/EC), which obliges the Member States to ensure that non-ETS emissions are reduced by -10% below 2005 levels by 2020.

The functioning of the EU ETS can be summarised as follows:

- An absolute quantity limit or **cap on GHG emissions** is assigned to emitting facilities operating within the EU;
- **Tradable allowances** or EU Allowances (EUAs) are subsequently allocated to these facilities;
- These facilities are obligated to **measure and report** their GHG emissions and then surrender an allowance for every ton of GHG they emit during annual compliance periods;
- Installations that have emitted more GHGs than the amount of EAUs allocated to this installation need to buy EAUs on the **market**, in order to be able to submit an amount of EAUs that is equal to the amount emitted. Installations that have emitted less GHGs than the amount of EAUs allocated can sell their surplus of EAUs on the market;
- In addition to EAUs, the covered installations can also submit **international credits** coming from CDM projects (so called CERs) or from JI projects.

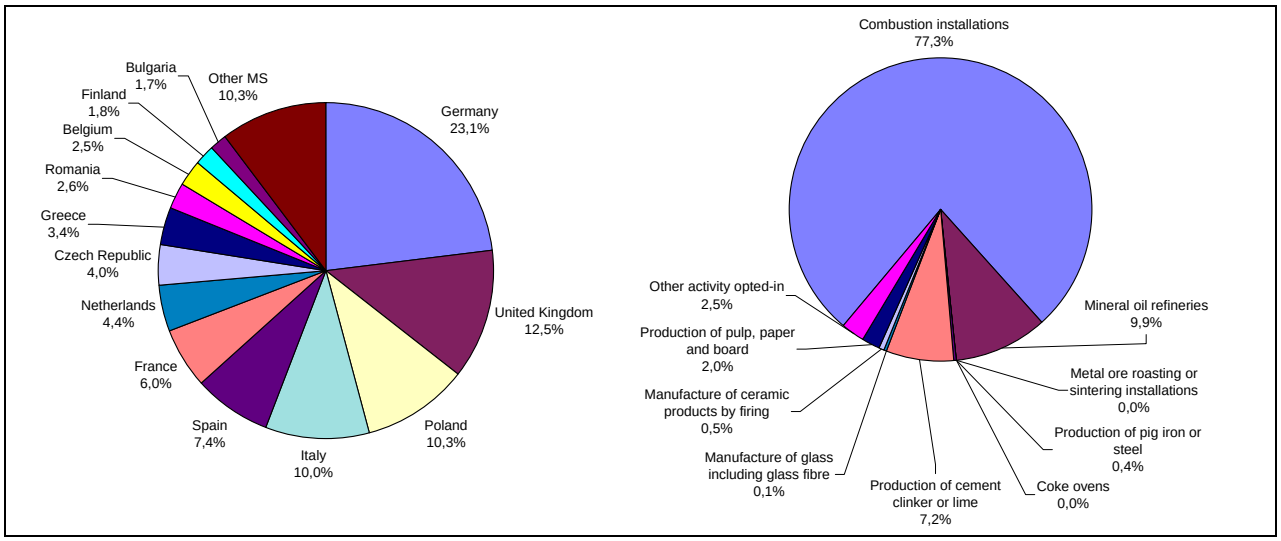
Source: Ellerman & Joskow 2008

EUAs, which entitle to emit one tonne of GHG, are distributed to all of the installations participating in the ETS. At the end of each year, the covered installations have to surrender one EUA for each tonne of GHG which they have emitted. The number of emission allowances that will be distributed will decline over time so that total emissions are reduced. In 2020, the ETS will achieve a -21% reduction relative to 2005 emission levels and this contribution will enable the EU to reach its' objective of an economy wide reduction of -20% below 1990 emission levels.

The limit on the total number of allowances available ensures that they acquire a monetary value, which then provides a financial incentive to reduce GHG emissions in those installations where it is most cost efficient. Depending on the carbon price operators of covered installations need to decide whether to make or buy: if the envisaged costs of GHG reductions in their installations are smaller than the carbon price they 'make' these reductions whereas they 'buy' reductions in form of allowances, if the carbon price is lower then their own costs. By this way it is ensured that the reductions are achieved at least cost. At the end of each year, every installation must surrender enough allowances to cover their GHG emissions. If this does not happen then fines are imposed upon the installations that fail to comply.

An overview of the verified ETS emissions in 2009 (Figure 1) illustrates that combustion installations, such as power stations or other industrial boilers were responsible for the vast majority (77.3%) of ETS emissions, followed by emissions from mineral oil refining (9.9%) and cement, clinker or lime production (7.2%). Germany has the largest ETS emissions of all of the Member States, with a 23.1% share in total ETS emissions in 2009. The United Kingdom and Poland also have considerable shares in the total ETS emissions for 2009 with 12.5% and 10.3% respectively. Currently the EU ETS covers, in addition to all 27 Member States, the two EEA states Norway and Lichtenstein. From 2012 onwards, Switzerland will also join the EU ETS, increasing the number of participating countries to 30.

Figure 1 Verified ETS emissions by Member States and by sectors in 2009



Source: UNFCCC, CITL, own calculations

In addition to the domestic action of installations participating in the emissions trading system to reduce their emissions, the introduction of the Linking Directive (2004/101/EC) allows for the use of credits from Joint Implementation (JI) and Clean Development Mechanism (CDM) projects in third countries to also meet their emission reduction obligations (Chapter 2). The option to purchase external emission credits provides additional flexibility for installations and further lowers the cost of compliance. However, it is envisaged that the use of these external credits should only be supplementary to the domestic effort of EU ETS installations.

1.2. Evolution

The ETS involves considerable intervention from the regulator to ensure that the system operates effectively by setting the emissions cap, allocating emission allowances and creating the rules of the emissions market. As a consequence, the evolution of the ETS has been characterised by a continuous adaptation of the system in order to enhance its environmental integrity.

1.2.1. Phase I

Phase I of the EU ETS (2005-2007) is often regarded as the 'trial period' for the system when many of the initial design flaws were identified and subsequently addressed (Figure 3). The allocation of allowances in Phase I was determined by the Member States which submitted so called National Allocation Plans (NAPs) to the Commission for review and approval. The NAPs set the overall cap for the country and allocated allowances to every participating installation. The allocation of allowances in the EU ETS are determined for each trading period at a time to account for the fact that annual GHG emissions fluctuate depending on the economic conditions. The allowances were issued annually but remained valid for covering emissions in any year within the trading period of 2005-2007. In addition the issuing of allowances occurred at the end of February, which was two months before allowances for the preceding year must be surrendered. Therefore installations were able to cover shortages for a certain year by the allowances that were allocated for the following year (Ellerman & Joskow 2008).

The National Allocation Plans for the majority of Member States were characterised by modest caps and inflated projections of emissions resulting in an over-allocation of allowances. This over-allocation of allowances in Phase I of the EU ETS combined with a lack of experience and capacity in emissions trading by the participants resulted in the volatility of the EUA price illustrated in Figure 2. Within the initial phase of the EU ETS the price for allowances peaked at € 30/EUA in early 2006. This coincided with the power sector experiencing a shortage of allowances due to rising gas prices, which incentivised a switch to coal power production and thus increased emissions. However, given that only the power sector was actively trading in this period, market participants wrongly assumed that there was an overall shortage in the supply of allowances (Egenhofer et al. 2011). This resulted in the EUA price declining considerably following the release of verified emissions data in April 2006. The restriction in trading between the first and second periods exacerbated the decline of the price of EUAs in Phase I.

Figure 2 CO_2 price development 2005-2010

Source: EEX, own calculations

1.2.2. Phase II

Following the identification of the limitations experienced in Phase I, the second period (2008-2012) was designed to improve upon the system (Figure 3). The second round of NAPs were more ambitious than in the previous trading period. This was because the EU Commission acquired the authority to impose a formula to assess the allocation plans of Member States and emission projections were objectively based on the verified emissions of 2005. Despite the setting of more robust caps in Phase II, the price of EUAs declined considerably in response to the economic crisis (Figure 2). However, it is important to acknowledge that Phase II of the EU ETS continued to deliver a relatively stable price signal for low carbon technology of approximately € 15/EUA even though the economic recovery within the EU was only tentative in 2010.

1.2.3. Aviation

In 2008, the inclusion of the aviation sector was adopted (Directive 2008/101/EC). Emissions of all national or international flights arriving in or departing from the EU will be covered from 2012 onwards. The cap corresponds in 2012 to 97% and from 2013 onwards to 95% of the average emissions from 2004 to 2006. Since emissions continued to grow by 4 to 5%/a, the cap corresponds to about 80% of the emissions in 2010. 82% of these allowances will be allocated for free while 15% will be auctioned. The remaining 3% will be set aside for new entrants or fast growing airlines.

1.2.4. Lessons learned from phases I and II

Phases I and II of the EU ETS were both characterised by similar limitations, which resulted in the scheme receiving criticism about the extent of its environmental integrity. Given that free allocation of emission allowances were provided to installations in both Phase I and II many firms made considerable 'windfall profits' by realising the opportunity cost of receiving a valuable asset free of charge while passing through the GHG allowance 'cost' to the end consumer. Windfall profits have been estimated to be approximately € 13 billion annually (Keats & Neuhoff 2005, Ellerman et al. 2010). Furthermore, the experience with free allocation for Phase I and II proved that free allocation is not only a distributional issue and can have negative impacts on the cost-efficiency of the scheme.

1.3. Future

In preparation for Phase III (2013-2020), the EU adopted a Directive (2009/29/EC) to further improve the operation of the EU ETS and several important changes have been made to the existing system.

1. The **scope** of the EU ETS will be extended to include new sectors and new gases (i.e. CO_2 emissions from petrochemicals, ammonia and aluminium sectors as well as N_2O emissions from the production of nitric and adipic acid and PFC emissions from aluminium production).
2. An **EU wide cap** to deliver a 20% reduction in GHG emissions below 1990 levels by 2020 and a 50% reduction below 1990 levels by 2050 replaces the previous setting of individual caps for Member States based upon their NAP.
3. Addressing the issue of **price volatility** within the scheme by enhancing cost containment measures (i.e. banking and access to the use of international credits, which will be limited to 50% of the reduction effort required in the EU ETS, according to Article 11a(8) of the ETS Directive).
4. EUAs will be **auctioned** throughout Phase III except for sectors which are at risk of carbon leakage where the share of free allowances will decline from 80% in 2013 to 30% in 2020.

It is envisaged that Phase III will improve the effectiveness of the system as a result of the introduction of the changes outlined above. The main improvements are described in the following sections.

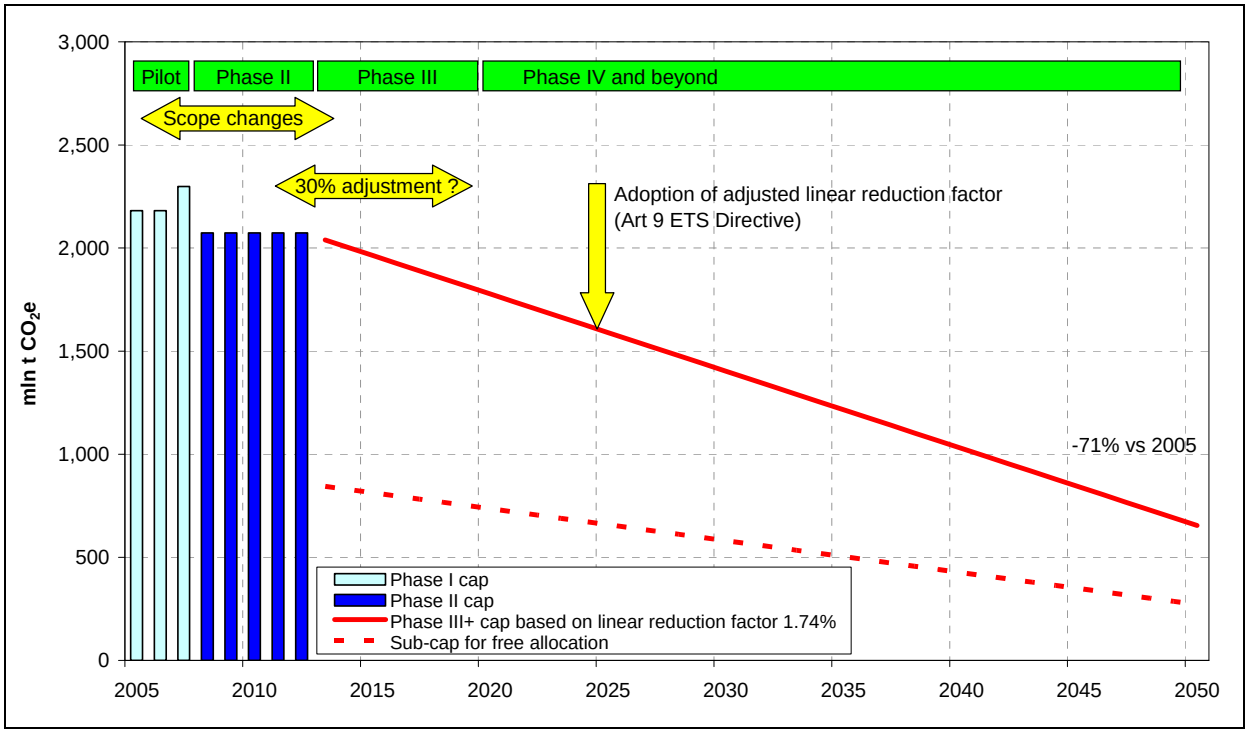
1.3.1. Scope

The extension in the scope of the EU ETS from 2013 onwards will further enhance the environmental integrity of the scheme, and will enable these additional sources of emissions to be abated in a cost efficient manner.

1.3.2. EU-wide cap

The issue of over allocation has been addressed by the setting of an EU wide cap in 2013, which will reduce annually by 1.74% delivering an overall reduction of 21% below 2005 verified emissions by 2020 (Figure 3). The more centralised nature of this EU wide cap will prevent Member States from inflating their own caps as experienced in previous trading periods with NAPs.

Figure 3 Phases and caps of the European Union Emissions Trading System



Source: Own illustration

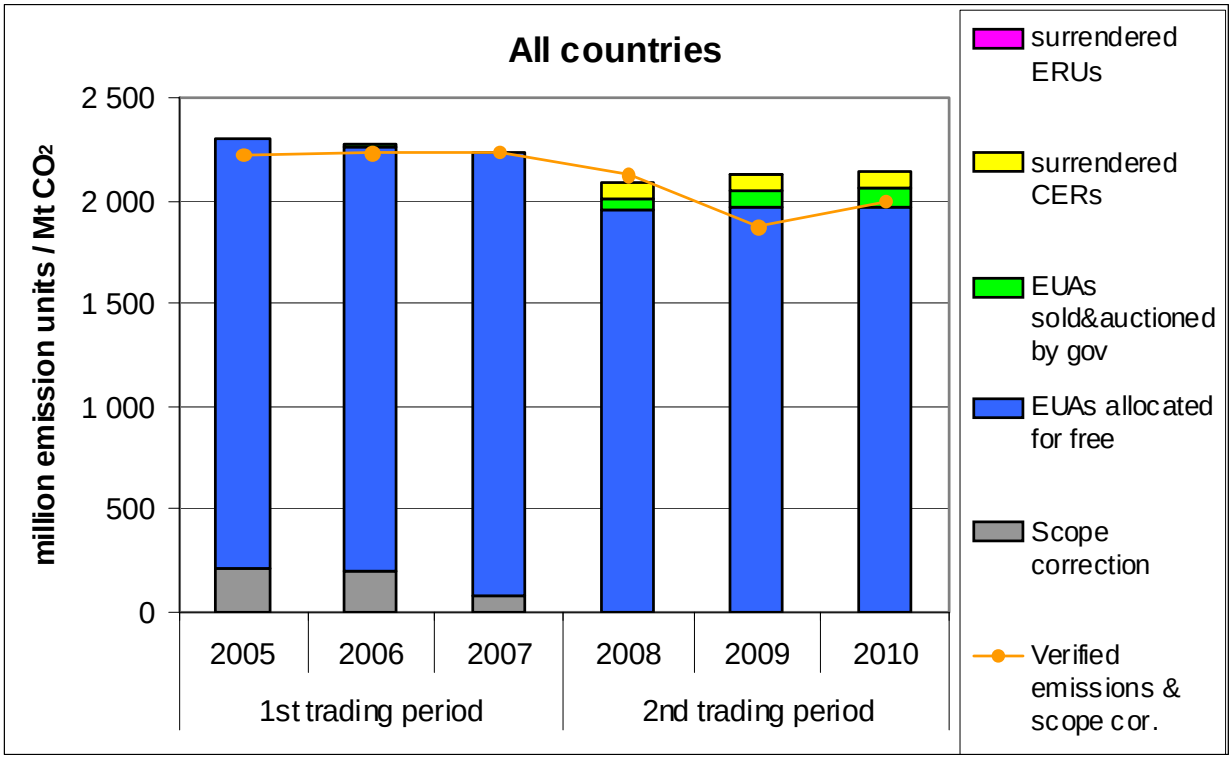
1.3.3. Price volatility

The extension of the trading period from five to eight years and the provision of a steady linear emissions reduction schedule are measures intended to ensure greater price stability in Phase III of the EU ETS. In addition, the provision for market participants to use EUAs banked from Phase II into Phase III is intended to avoid the price volatility that was experienced in the transition from Phase I to Phase II (Figure 2).

As a further cost containment provision within Phase III, installations will continue to have access to the use of international credits, which refer to emission reductions from CDM projects in third countries. However, the overall use of these international credits will be restricted to 50% of the EU wide emission reduction during the period 2008-2020. Although Phase III is associated with a more ambitious cap compared to previous trading periods to contribute to the climate policy of the EU, the environmental integrity of the scheme has been subjected to further criticism for the quantity of EUAs that will be carried over into Phase III and the delay in 'real' reductions being realised.

For example, in 2009 and 2010 the available emission units were higher than verified emissions, leading to a surplus of 255 M EUAs in 2009 (Figure 4). In total operators were able to bank 235 M EUAs from the years 2008 to 2009 for use in later years. There was a substantial CDM use in the year 2009 despite the fact that in 2009 emissions were below the available amount of EUAs. This means that many operators have used cheap CDM credits and have sold or will bank unused EUAs that can be used for compliance in later years. Given the surplus of allowances that have been banked as a consequence of the economic recession the use of these allowances may delay domestic effort from taking place in the Member States.

Figure 4 Allocation of allowances in 2005-2010 compared to verified emissions



Source: EEX, own calculations

1.3.4. Auctioning

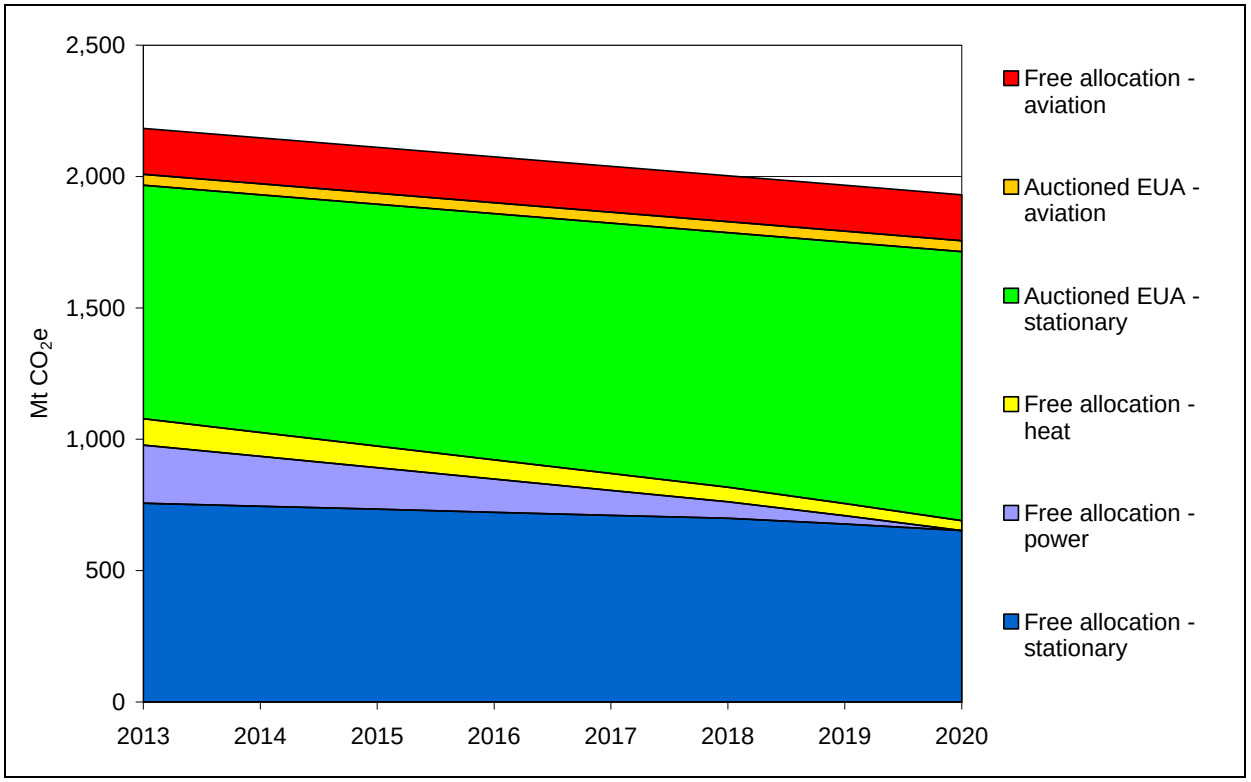
The introduction of auctioning as the main method of allowance allocation is intended to resolve the problem experienced with 'windfall profits' in Phase I and Phase II of the EU ETS as it is expected that the allocation of free allowances will be phased out entirely by 2027 except for sectors which are exposed to carbon leakage and for aviation. Figure 5 shows that the proportion of allowances that will be auctioned in Phase III will initially be low and will vary depending on the sector, with special provisions made for sectors defined as being at risk of carbon leakage.

The EU Commission produced a **list of 164 industrial sectors** and subsectors deemed to be at **risk of carbon leakage**, based upon criteria such as trade intensity and additional carbon costs as a proportion of gross added value and would allocate these sectors up to 100% of an installation's allocation for free to prevent energy intensive installations from relocating outside of the EU in response to climate policy, which would result in carbon leakage. As a consequence, energy-intensive industries within the EU ETS will continue to annually receive approximately 650 M EUAs throughout the third phase of the scheme (Figure 5).

In order to encourage energy efficiency improvements the allocation of these free allowances would also be based upon stringent product **benchmarks** based on the average of the 10% most efficient installations. Due to the stringency of the benchmarks, it is anticipated that only the most efficient installations will have all of their emissions covered by the free allocation. The benchmarks will be multiplied by a historical production figure, a declining allocation factor unless the sector is considered at risk of carbon leakage and the cross sectoral adjustment factor that is necessary to take account of the annually declining total cap for free allocation (Draft decision as of 15/12/2011).

Given the continuation of free allocation throughout the third phase and the introduction of allocation benchmarking it is anticipated that energy intensive companies may obtain **windfall profits** as marginal installations, which are more energy intensive, set the market price for a product enabling more energy efficient installations to profit from passing through the opportunity cost of their free allocation to consumers (Bruyn et al. 2010). In contrast, the power sector in the EU-15 Member States will be obligated to purchase 100% of allowances via auctioning (Figure 5) and therefore the potential for windfall profits in this sector is diminished.

Figure 5 Allocation of EUAs in Phase III



Source: Own calculations

1.3.5. Summary

It is evident that the improvements suggested to Phase III of the EU ETS will address some of the previous problems associated with earlier phases, however the implementation or continuation of some of these measures such as multi period trading, free allowances for installations at risk of carbon leakage and the use of offsets may further delay the domestic reduction effort of Member States. There is a growing consensus that an increase in the ambitious of the EU wide reduction target from 20% to 30% is necessary to create a price signal that is strong enough to incentivise innovation and facilitate the low carbon transition. In addition, a suitable set of complementary policies and measures is essential if the EU is to achieve its more aspirational emissions reduction target of 80% below 2005 levels by 2050 (EC 2011, Jaeger et al. 2011, Matthes 2010).

As a summary, Table 1 provides an overview of the legal steps and the main issues regarding the improvement of the EU ETS from its establishment in 2003 until the latest review in 2009, which sets the scene for the long term transition towards a carbon free economy.

Table 1 Development of the European Union Emissions Trading System

Act	Entry into force	Short title	Main issues
Directive 2003/87/EC	25/10/2003	EU ETS directive	Establishing the ETS for Phase I & II with provisions for national allocation of allowances, for monitoring, verification & reporting and for establishing implementing institutions such as registries and competent authorities
Amendments			
Directive 2004/101/EC	13/11/2004	Linking directive	Use of project-based flexible mechanisms (CDM & JI)
Directive 2008/101/EC	02/02/2009	Inclusion of aviation	Extension of the scope of the EU ETS to the aviation sector
Directive 2009/29/EC	25/06/2009	Review of the EU ETS	EU-wide cap for Phase III & IV, linear reduction factor -1.74%/a, harmonised allocation, introducing mandatory auctioning, free allocation to address carbon leakage based on benchmarks, extending the scope in terms of sectors and gases and linking to other mandatory ETS with absolute caps
Selected related acts			
Commission Regulation (EU) No 1031/2010	19/11/2010	Auctioning regulation	Establishing a common platform to auction emission allowances
Commission Decision C (2009) 10251	06/01/2010	Carbon leakage	List of 164 sectors and subsectors with a significant risk of carbon leakage
Draft decision as of 15/12/2011	Scrutiny period	Benchmarks	Harmonised and EU-wide rules for free allocation based on ambitious benchmarks
Draft decision as of 21/02/2011	Scrutiny period	Industrial gases	Exclusion of CER from HFC-23 and N_2O projects for compliance after 30/04/2013

Source: EU 2011; own compilation

2. INTRODUCTION TO THE FLEXIBLE MECHANISMS

2.1. Overview of the flexible mechanisms

2.1.1. Clean Development Mechanism

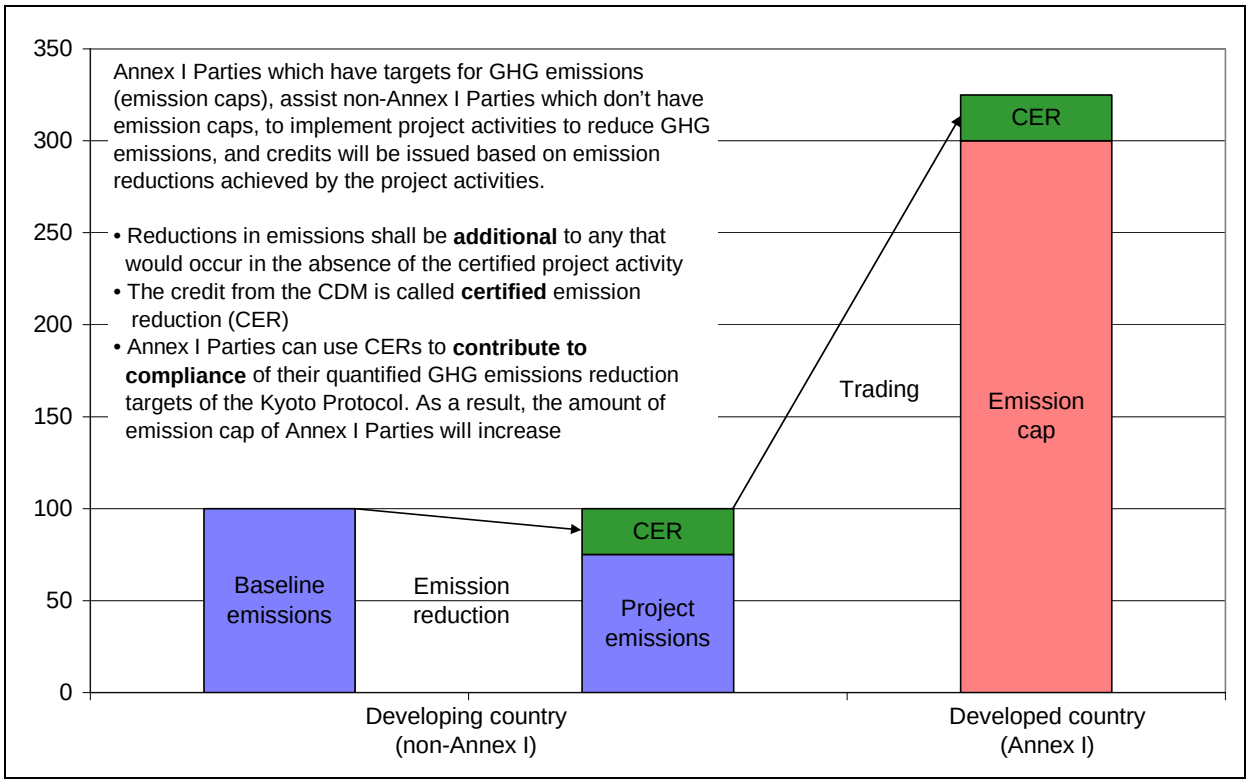
The Clean Development Mechanism (CDM) is one of the flexible instruments established under the Kyoto Protocol (Article 12). It allows emission reduction projects in developing countries (so called non-Annex I Parties) to earn certified emission reduction (CER) credits, which are then used to meet some of the emission reduction targets of developed countries (so called Annex I Parties). Within the context of the EU, CER credits are allowed to be traded within the EU ETS (Linking Directive 2004/101/EC).

In order to ensure environmental integrity it is essential than any reduction achieved in CDM projects "are additional to any that would occur in the absence of the certified project activity" (Article 12.5 (c) KP). To determine the emission reduction achieved in a project, several definitions and assumptions have to be agreed and registered before issuance of credits:

- Clear project boundaries which ensure that emissions do not leak to other activities;
- A baseline which describes how emissions would have developed in case of absence of the project activity;
- A crediting period which may last from 7 to 21 years;
- A monitoring plan which describes how the actual project emission will be determined throughout the crediting period.

Credits will be issued for the amount which the actual project emissions fall short of the baseline emissions (Figure 6).

Figure 6 Functioning of the Clean Development Mechanism (CDM)



Source: IGES 2011, own compilation

The CDM embodies several of the guiding principles included in the UNFCCC. In particular, Article 4 in the UNFCCC emphasises the 'common but differentiated responsibility' of the Parties, and this in theory, is demonstrated by the financial commitment from developed countries to facilitate technology transfer in developing countries (through the CDM) in order to mitigate climate change (Birnie, Boyle 2002). The political importance of the CDM in the Kyoto Protocol negotiations was particularly important for achieving a binding agreement. According to Grubb (1999) the CDM 'crystallized' the political compromise at the 'heart' of the Kyoto Protocol, which ultimately persuaded the developing countries (who refused to take on emission caps) to participate in the global climate regime. This allowed for the lowering of GHG reduction abatement costs and allowed developed countries to meet their obligations. As a consequence of this political compromise, the CDM has the dual objective of achieving GHG reductions whilst also promoting sustainable development.

Example: Umbrella Fuel-Switching Project in Bogotá and Cundinamarca

The project activity primarily aims at reducing GHG emissions through fuel switching. The project consists of investment to replace the use of liquid petroleum fuels by natural gas, funded through the sale of carbon credits in the context of the CDM. Eight companies in the food production sector (beer, milk and meat products, etc.) as well as in industrial sectors such as wire or crystal production lead this fuel oil to natural gas switching project, which involves the conversion of equipment of their industrial facilities located in the Colombian Department of Cundinamarca. Before the start of the project, the industrial facilities consumed residual fuel oil to generate steam and process heat. The project also brings the inherent benefits of switching residual fuel oil to natural gas:

- Improvement of air quality due to less emission of local pollutants such as NO_x, SO_x, and particulate matter.
- Improvement of labour and health conditions of its employees.
- Lower potential sources of risks, because natural gas does not require any storage.
- Lower maintenance of the equipment.
- Lower dirtiness and corrosion at the plants.
- Continuous supply of fuel.
- Less vehicular traffic due to elimination of fuel delivery trucks and therefore less risk of accidents as well as elimination of tailpipe emissions from these vehicles.

The project was registered at 25 September 2006 and is implemented by Gas Natural S.A. E.S.P., a Spanish gas utility. Spain and Switzerland are the investor countries, Colombia is the host country. Over the 10 year crediting period, the project will reduce 327 Mt of GHG. Up to now, 107 million CERs have been issued for the period from 2004 to 2007.

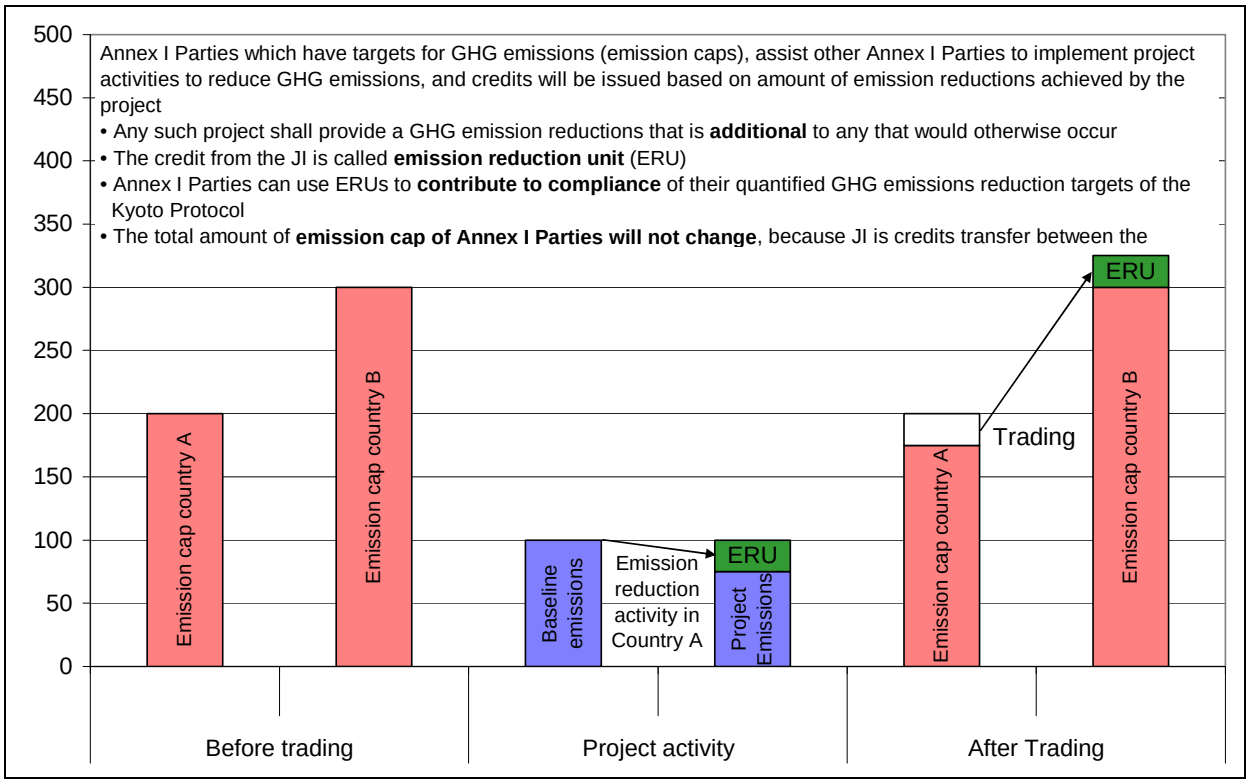
Source: UNFCCC (http://cdm.unfccc.int/Projects/DB/DNV-CUK1150715630.86/view)

2.1.2. Joint Implementation

Greenhouse gas reduction projects among developed countries can be carried out under Joint Implementation (JI) which was established by Article 6 of the Kyoto Protocol. The country where the project is carried out is called host country while the country which finances the additional cost needed to achieve the greenhouse gas reduction is called investor country. JI offers investor countries a flexible and cost-efficient means of fulfilling a part of their Kyoto commitments, while the host country benefits from foreign investment and technology transfer.

The units issued for each tonne reduced are called Emission Reduction Units (ERUs) can also be used with to comply with requirements under the EU ETS. In contrast to CERs, ERUs do not increase the total amount of greenhouse gas emissions which can be emitted in developed countries (Annex I countries), because here also the host country has a Kyoto target. This is because the emissions of the investor country may only increase by the same amount which they decrease in the host country (Figure 7).

Figure 7 Functioning of Joint Implementation (JI)



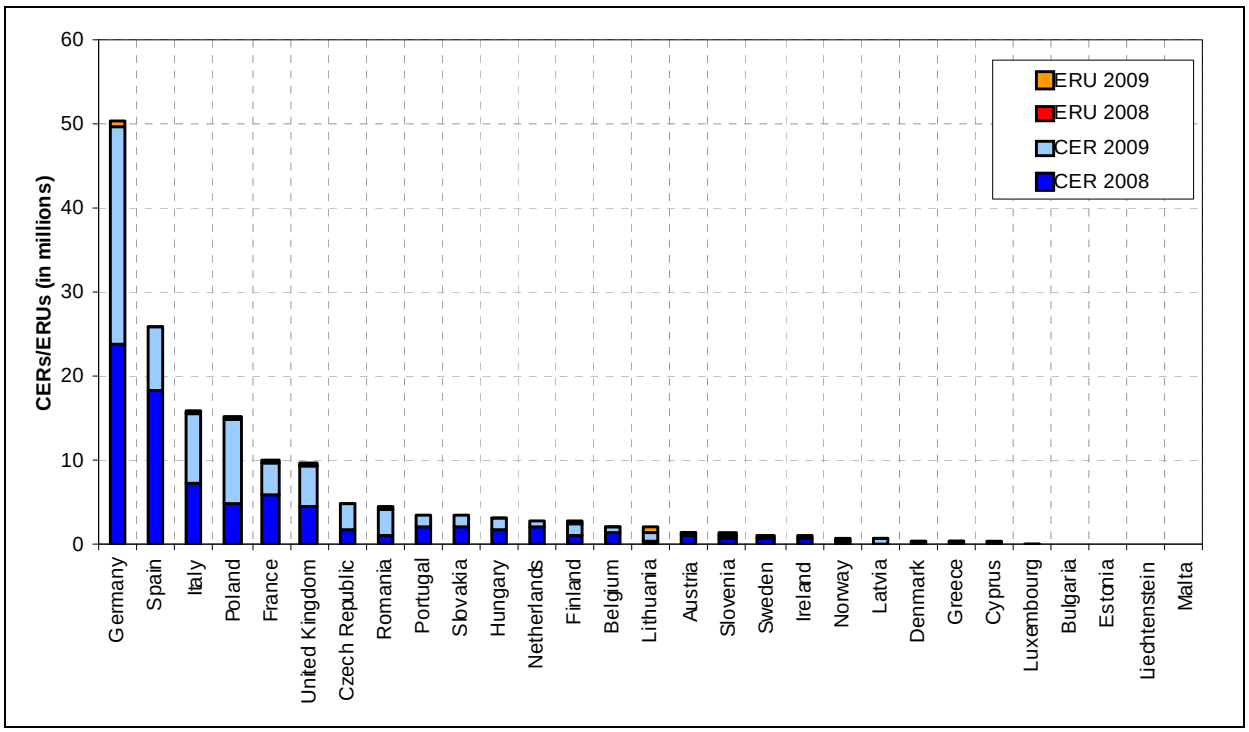
Source: IGES 2011, own compilation

Despite this fundamental difference JI is also a project-based mechanism and in this regard quite similar to the CDM. Emission reductions need to be additional to any that would occur in the absence of the project activity. Accordingly, similar steps have to be carried out be for EURs can issued (determination of project boundaries, baseline, crediting period and a monitoring plan).

2.2. Evolution of the CDM

Following the ratification of the Kyoto Protocol, the CDM became operational in 2005 and was initially expected to produce an anticipated reduction of 2.7 billion tonnes of CO_2e in the first commitment period of 2008-2012. However, due to operational delays with the mechanism, this estimate has subsequently been downgraded to an expected reduction of 1.4 billion tonnes of CO_2e (Fenhann 2009). Despite of this, the volume of expected GHG emissions reductions remains significant, and thus continues to demonstrate how the mechanism is encouraging investment in GHG abatement projects. From the beginning of the second trading period onwards, companies falling under the EU ETS are permitted to use not only emission allowances (EUAs) but also credits from CDM and JI projects (CERs and ERUs) to meet their obligation under the scheme. The use of CERs and ERUs in the EU ETS increased slightly from 2008 to 2009, rising from 24 million CERs in 2008 to 27 million CERs and ERUs in 2009 (Figure 8). The majority of credits from the project-based mechanisms that were used within the framework of the EU ETS stemmed from CDM projects.

Figure 8 Use of CDM and JI credits to fulfil the obligation under the EU ETS, 2008 and 2009



Source: CITL, own compilation

2.2.1. Geographical distribution

From an economic perspective it is undeniable that the CDM is delivering on its objective to reduce GHG emissions at minimal cost. However, the poor distribution of CDM projects has been a frequent criticism of the mechanism. Van der Gaast et al. (2009) highlight the fact that **72% of all projects** in the CDM pipeline were **located in Asia and the Pacific** compared to only 1.5% of all CDM projects being implemented in Sub-Saharan Africa. This uneven distribution reflects the fact that the CDM currently **favours developing countries** that are industrialising, **such as China and Brazil**, where there are more economically attractive opportunities for GHG emission reductions (e.g. through the modification of GHG intensive industrial processes). In contrast, the poorest developing countries are considerably disadvantaged by their lower levels of industrialisation and as a consequence can only provide investors with more expensive opportunities for smaller GHG emissions reductions (e.g. energy efficiency, renewable energy). Ellis et al. (2007) demonstrates this significant disparity by calculating the combined CERs from 161 proposed renewable energy CDM projects which are expected to be lower than from four HFC-23 reducing projects.

2.2.2. Additionality

Furthermore the CDM can lead to counter-productive incentives for governments to create none of their own rules on the promotion or flanking of projects which are also eligible for registration under the CDM. In the case of such regulations the additionality of the respective projects would no longer apply; the (international) companies interested in CDM project development would naturally try to influence the governments accordingly.

This can also lead to a 'race to the bottom' with regards to the acceptance by host countries of projects that are associated with low sustainability benefits to secure inward investment. Sutter & Parreno (2007) analysed the GHG reductions and sustainable development benefits of 16 registered CDM projects. Based on sustainable development criteria, RE-CDM projects substantially outperform CDM projects with 'end of pipe' solutions. For example, while the NovaGerar Landfill Gas to Energy Project will provide 0.030 person months of employment per 1,000 CERs generated; the Clarion Biomass Power Project will provide 304.183 person months of employment per 1,000 CERs generated. The overall conclusion of the study was that, while 72% of the total portfolio's expected CERs are likely to represent real GHG reductions, less than 1% are likely to contribute significantly to sustainable development in the host country. From the Sutter & Parreno (2007) study, one can conclude that the CDM is failing to deliver on its sustainable development commitments and does not represent a 'win win' solution for both GHG reduction and sustainable development.

2.2.3. Leakage

Finally it should be noted that the generation of CDM credits represents in economic terms an investment subsidy for the respective plants. For those industries subject to international competition CDM projects can result in a counter-productive leakage effect. The aim is to avoid or reduce leakage effects by means of free allocation of emission allowances in the EU ETS or other measures. At the same time leakage trends can, in some sectors at least, be intensified by the de facto subsidisation of corresponding plants in countries not regulated by the EU ETS.

2.2.4. Summary

Obviously the CDM has frequently been criticised for its weaknesses which basically stem from the fact that each project is based on counterfactual assumptions which finally cannot be falsified. Nevertheless, the CDM has constantly improved. Many methodologies for the determination of baselines and project emissions have been in environmental terms strengthened and at the same time simplified. And only in December 2010 in Cancún the Conference of the Parties serving as the Meeting of the Parties (CMP) agreed to establish standardised baselines which can by applied to multiple projects and which may help to improve environmental integrity and objectivity and to reduce transaction cost.

2.3. Future of international market mechanisms

While from an EU perspective reforming of existing market based mechanisms is important, it is even more important to develop new scaled-up market mechanisms that should be established in parallel to the existing ones, in order to enable deeper emission reductions both in developed and developing countries. In this sense, new market-based mechanisms should go beyond pure offsetting and encourage developing countries to achieve a deviation from business as usual (BAU) in their own responsibility.

So called **sectoral approaches** or broader, new market-based mechanisms refer to mechanisms that stimulate the reduction of GHG emissions across entire sectors or broad segments of the economy and generate units for efforts that go beyond pure offsetting in developing countries. They would no longer be based on individual reduction projects but include all activities in a pre-defined boundary of sector or broad segment of the economy. With these new market-based mechanisms, developed countries can adopt more ambitious mitigation targets, and developing countries can access to the carbon market while also contributing to global mitigation efforts.

Two types of new market-based approaches covering broad segments of the economy can be distinguished (Schneider & Cames 2009):

- Crediting: Existing emissions of a broad segment of an economy will be checked against an ex-ante agreed threshold for this segment. If emissions are below this baseline, emission credits will be issued, which can be sold to recover at least partly the cost of mitigation activities. If emissions are not below the baseline, no penalty will be applied (no-lose target).
- Trading: In accordance with an ex-ante defined absolute target for a broad segment of an economy, emissions allowances will be issued. If emissions are lower than the number of issued allowances, excess allowances can be sold to recover, at least partly, the cost of mitigation activities. If emissions are higher than the number of issued allowances, additional allowances need to be purchased on the global carbon market to comply with the target agreed for the broad segment.

Units from both types can be used for compliance by any Party with emission targets under the Convention. Under trading, tradable units will be issued ex-ante so that they can eventually be sold immediately on the market while under crediting units can be issued only ex-post after undercutting of the threshold has been verified. Such new market-based mechanisms would provide the following benefits:

- Overcome the weaknesses of the project-based approach by reducing options for leakage, double counting or perverse incentives and thereby improving the environmental integrity;
- Achieve ambitious global mitigation goals in on a cost-effective manner since these new approaches would address the entire mitigation potential in the covered sectors;
- Deliver tradable units for actions that go beyond pure offsetting, improving thereby the environmental integrity of the carbon market and generating revenue from the sale of credits;
- Encourage low carbon investments and leverage private sector investment in developing countries.

Such sectoral approaches are considered as an important step on the way towards a global carbon market. Therefore it is envisaged that advanced developing countries could take the lead in establishing such approaches initially in certain sectors while least developing countries would still apply the improved CDM for a number of years.

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